

# SPECTRUM PLANNING, INC.

## ANTENNA HEIGHT ANALYSIS

8 JAN 1987

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|                 |               |               |                                 |
|-----------------|---------------|---------------|---------------------------------|
|                 | <u>SITE A</u> | <u>SITE B</u> |                                 |
| Site name       | HOPEWELL GAP  | TYSONS CORNE  | Dist 25.448 miles               |
| Latitude        | 38-52-20.00   | 38-55-13.00   | Freq 6.173 GHz                  |
| Longitude       | 77-41-53.00   | 77-13-48.00   | Clearance 1) 1.00 F @ K = 1.333 |
| Elev (ft)       | 1160.00       | 520.00        | 2) .30 F @ K = .667             |
| Existed ?       | no            | no            |                                 |
| Fixed ht (ft)   |               |               |                                 |
| Max ant ht (ft) | 150.00        | 150.00        |                                 |
| Min ant ht (ft) | 10.00         | 10.00         |                                 |
| Increment (ft)  | 5.00          | 5.00          |                                 |

| Profile input points |       |      | (Ground elevations(AMSL) in ft, Obstruction heights(AGL) in ft) |      |      |       |      |      |       |      |      |
|----------------------|-------|------|-----------------------------------------------------------------|------|------|-------|------|------|-------|------|------|
| Dist                 | Gnd   | Obht | Dist                                                            | Gnd  | Obht | Dist  | Gnd  | Obht | Dist  | Gnd  | Obht |
| (mi)                 | (ft)  | (ft) | (mi)                                                            | (ft) | (ft) | (mi)  | (ft) | (ft) | (mi)  | (ft) | (ft) |
| .01                  | 1160. | 35.0 | 6.28                                                            | 300. | 0.0  | 13.87 | 300. | 0.0  | 21.20 | 350. | 0.0  |
| .35                  | 700.  | 0.0  | 6.32                                                            | 340. | 0.0  | 14.20 | 310. | 0.0  | 21.50 | 376. | 0.0  |
| .50                  | 610.  | 0.0  | 7.55                                                            | 280. | 0.0  | 14.70 | 340. | 0.0  | 22.30 | 300. | 0.0  |
| .58                  | 685.  | 0.0  | 7.90                                                            | 220. | 0.0  | 15.00 | 350. | 0.0  | 23.50 | 400. | 0.0  |
| 1.15                 | 550.  | 0.0  | 8.45                                                            | 320. | 0.0  | 15.65 | 370. | 0.0  | 24.30 | 400. | 0.0  |
| 1.90                 | 460.  | 0.0  | 8.70                                                            | 340. | 0.0  | 16.39 | 390. | 0.0  | 24.50 | 426. | 0.0  |
| 2.65                 | 440.  | 0.0  | 9.60                                                            | 280. | 0.0  | 16.90 | 400. | 0.0  | 24.87 | 480. | 50.0 |
| 3.20                 | 365.  | 0.0  | 10.20                                                           | 260. | 0.0  | 17.50 | 440. | 50.0 | 25.03 | 450. | 0.0  |
| 3.35                 | 400.  | 0.0  | 10.77                                                           | 270. | 0.0  | 18.01 | 350. | 0.0  | 25.41 | 510. | 50.0 |
| 4.32                 | 420.  | 0.0  | 12.05                                                           | 300. | 0.0  | 19.00 | 350. | 0.0  |       |      |      |
| 5.58                 | 300.  | 0.0  | 12.65                                                           | 250. | 0.0  | 19.81 | 330. | 0.0  |       |      |      |
| 5.65                 | 340.  | 0.0  | 13.30                                                           | 260. | 0.0  | 20.40 | 350. | 0.0  |       |      |      |

| Control pt no        | 1       | 2      | 3      | 4      | 5      | 6      | 7      | 8      |
|----------------------|---------|--------|--------|--------|--------|--------|--------|--------|
| Dist from A (mi)     | .01     | 17.50  | 23.50  | 24.30  | 24.50  | 24.87  | 25.03  | 25.41  |
| Dist from B (mi)     | 25.44   | 7.95   | 1.95   | 1.15   | .95    | .58    | .42    | .04    |
| Grd elev (ft)        | 1160.00 | 440.00 | 400.00 | 400.00 | 426.00 | 480.00 | 450.00 | 510.00 |
| Above grd ht (ft)    | 35.00   | 50.00  | 0.00   | 0.00   | 0.00   | 50.00  | 0.00   | 50.00  |
| Bulge @ K=1.333 (ft) | .13     | 69.55  | 22.89  | 13.95  | 11.62  | 7.19   | 5.24   | .49    |
| 1.0 Fresnel (ft)     | 2.90    | 67.84  | 38.92  | 30.39  | 27.73  | 21.82  | 18.61  | 5.68   |
| Bulge @ K= .667 (ft) | .25     | 139.10 | 45.79  | 27.90  | 23.23  | 14.38  | 10.47  | .97    |
| .3 Fresnel (ft)      | .87     | 20.35  | 11.68  | 9.12   | 8.32   | 6.54   | 5.58   | 1.70   |

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Center frequency 6.173 GHz; Clearance criteria 1) 1.000 F at K = 1.333  
 2) .300 F at K = .667

Site 1Site 2

|                |              |              |
|----------------|--------------|--------------|
| Site name      | HOPEWELL GAP | 1YSUNS CORNE |
| Latitude       | 38-52-20.00  | 38-55-13.00  |
| Longitude      | 77-41-53.00  | 77-13-48.00  |
| Elevation (ft) | 1160.00      | 520.00       |

Varying antenna height of site 1

| Site 1         | Site 2      |
|----------------|-------------|
| Height (ft) FN | Height (ft) |
| 40.00 8        | 45.21       |
| 45.00 8        | 45.20       |
| 50.00 8        | 45.19       |
| 55.00 8        | 45.19       |
| 60.00 8        | 45.18       |
| 65.00 8        | 45.17       |
| 70.00 8        | 45.16       |
| 75.00 8        | 45.16       |
| 80.00 8        | 45.15       |
| 85.00 8        | 45.14       |
| 90.00 8        | 45.13       |
| 95.00 8        | 45.13       |
| 100.00 8       | 45.12       |
| 105.00 8       | 45.11       |
| 110.00 8       | 45.10       |
| 115.00 8       | 45.10       |
| 120.00 8       | 45.09       |
| 125.00 8       | 45.08       |
| 130.00 8       | 45.07       |
| 135.00 8       | 45.07       |
| 140.00 8       | 45.06       |
| 145.00 8       | 45.05       |
| 150.00 8       | 45.04       |

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| Elevation (ft) | 1160.00      | 520.00       |

Varying antenna height of site 2

| Site 1         | Site 2      |
|----------------|-------------|
| Height (ft) FN | Height (ft) |

|        |   |        |
|--------|---|--------|
| 179.17 | 8 | 45.00  |
| 38.28  | 1 | 50.00  |
| 38.27  | 1 | 55.00  |
| 38.27  | 1 | 60.00  |
| 38.27  | 1 | 65.00  |
| 38.27  | 1 | 70.00  |
| 38.27  | 1 | 75.00  |
| 38.26  | 1 | 80.00  |
| 38.26  | 1 | 85.00  |
| 38.26  | 1 | 90.00  |
| 38.26  | 1 | 95.00  |
| 38.26  | 1 | 100.00 |
| 38.25  | 1 | 105.00 |
| 38.25  | 1 | 110.00 |
| 38.25  | 1 | 115.00 |
| 38.25  | 1 | 120.00 |
| 38.25  | 1 | 125.00 |
| 38.24  | 1 | 130.00 |
| 38.24  | 1 | 135.00 |
| 38.24  | 1 | 140.00 |
| 38.24  | 1 | 145.00 |
| 38.24  | 1 | 150.00 |

